

**FINDING OF NO SIGNIFICANT IMPACT
FAIRMOUNT DAM FISH LADDER PROJECT
SECTION 1135, IMPROVEMENTS TO THE ENVIRONMENT
PHILADELPHIA COUNTY, PENNSYLVANIA**

OVERVIEW

The United States Army Corps of Engineers has evaluated the reconstruction of the Fairmount Fish Ladder on the Schuylkill River in Philadelphia, Pennsylvania.

PURPOSE AND SPECIFICATIONS

The goal of the Fairmount Dam Fish Ladder Project is to significantly increase the ladder's efficiency through a redesigning and reconstruction of the structure to allow for passage of American shad, as well as other anadromous, catadromous and resident finfish species. This project is one of many fish passage projects that are to provide access to spawning and rearing habitat for migratory fish on the Schuylkill River. The Fairmount Dam fish ladder, as the most downstream passageway, is especially critical to the overall success of restoring fish passage on the Schuylkill River and its tributaries. All upstream work will be affected by the success or failure of the Fairmount Dam fish ladder at passing migratory species during spawning runs. The improvement to the ladder will be accomplished through renovations, the construction of additions to the existing ladder as well as modification of the design to allow American shad to proceed unimpeded through the ladder to the greatest extent possible so as to reach historic spawning and foraging areas upstream.

Many anadromous and catadromous fish spawning runs located throughout the Mid-Atlantic States have been lost through the construction of dams that are impassable to migratory fish. One such dam is the Fairmount Dam, which prevented passage of migratory species from 1818 until 1979. Starting in 1977 and continuing into 1978 a fish ladder was constructed on the western side of the Fairmount Dam. The original Fairmount fish ladder was completed and operational in 1979.

Great improvements in fishway technologies have been realized in the past 20 years since the Fairmount ladder was constructed. Better understanding of species needs for effective passage and structural modifications to increase efficiency are far more advanced than when the Fairmount ladder was originally constructed. Presently the ladder is operating at far less than optimal efficiency and could be more effective through the improvements, repairs and modifications that have been proposed.

It has been estimated by the U.S. Fish and Wildlife Service, that upon making recommended improvements to that ladder, 200,000 to 250,000 American shad (*Alosa sapidissima*) per year may utilize this structure during upstream migrations. In addition, it has been estimated that the Schuylkill River has enough habitat to support 700,000 to 800,000 shad. The target species for this project is American shad however, other species such as blueback herring (*Alosa aestivalis*), striped bass (*Morone saxatilis*), and American eel (*Anguilla rostrata*) could also benefit from this project. Resident fish species will benefit from the enhanced potential to reach suitable spawning and nursery habitats, as well as from a larger forage base provided by juvenile anadromous species. Improving the efficiency of the Fairmount fish ladder will provide access to approximately 12.2 miles of river to American shad as well as these other migratory fish species.

Improving fish passage at the Fairmount fish ladder will benefit the entire freshwater ecology and economy of the Schuylkill River watershed. The Fairmount Fish Ladder is the first fish ladder on Schuylkill River; hence the most important for fish passage, especially since the Pennsylvania Fish and Boat Commission are currently constructing a fish ladder at the next upstream dam to further open passage for migratory fish. Resident fish species will benefit from the enhanced potential to reach suitable spawning and nursery habitat, and from a larger forage base provided by juvenile anadromous

species. Some secondary benefits that are expected as a result of this project are an increase in educational potential of this facility through increased public access and an increased public education focus.

COORDINATION

The project was developed by cooperating agencies including: the U.S. Army Corps of Engineers, the Philadelphia Water Department, Pennsylvania Fish and Boat Commission, and the U.S. Fish and Wildlife Service.

The Environmental Assessment (EA) for the project was forwarded to the U.S. Environmental Protection Agency Region III, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Pennsylvania Fish and Boat Commission, the Pennsylvania Department of Environmental Protection, and all other known interested parties.

ENDANGERED SPECIES IMPACT

The Environmental Assessment has determined that the selected plan, if implemented, would not jeopardize the continued existence of any species or the critical habitat of any fish, wildlife or plant, which is designated as endangered or threatened pursuant to the Endangered Species Act of 1973 as amended by P.L. 96-159.

WATER QUALITY COMPLIANCE

Pursuant to Section 401 of the Clean Water Act, a 401 Water Quality Certificate will be obtained for this project through the Pennsylvania Department of Environmental Protection and their General Permit Program.

COASTAL ZONE

Based on the information gathered during the preparation of the Environmental Assessment, and the application of appropriate measures to minimize project impacts, it was determined in accordance with Section 307(C) of the Coastal Zone Management Act of 1972 that the plan complies with and can be conducted in a manner that is consistent with the approved Coastal Zone Management Program of Pennsylvania. A consistency determination from the Pennsylvania Department of Environmental Protection will be requested.

CULTURAL IMPACTS

The project site borders the historic Fairmount Dam and associated Fairmount Water Works, which are listed on the State and National Registers of Historic Places. The Pennsylvania State Historic Preservation Office (PASHPO) has reviewed the conceptual design for the project under Section 106 of the National Historic Preservation Act and has concluded that the project will have no adverse effect upon cultural resources in the area, specifically the Fairmount Park Historic District.

RECOMMENDATION

Because the Environmental Assessment concludes that the work described is not a major Federal action significantly affecting the human environment, I have determined that an Environmental Impact Statement is not required.

Date

Thomas C. Chapman, P.E.
Lieutenant Colonel, Corps of Engineers
District Engineer

ENVIRONMENTAL ASSESSMENT

FAIRMOUNT DAM FISH LADDER PROJECT
SECTION 1135, IMPROVEMENTS TO THE ENVIRONMENT
PHILADELPHIA, PENNSYLVANIA

PREPARED BY:
PHILADELPHIA DISTRICT
U.S. ARMY CORPS OF ENGINEERS
PHILADELPHIA, PENNSYLVANIA 19107

MARCH 2003

ENVIRONMENTAL ASSESSMENT
FAIRMOUNT DAM FISH LADDER PROJECT
SECTION 1135, IMPROVEMENTS TO THE ENVIRONMENT
PHILADELPHIA, PENNSYLVANIA

TABLE OF CONTENTS

1.0	Project Location	1
2.0	Study Authority	1
3.0	Purpose and Need for Action	1
4.0	Alternatives	4
4.1	No action	4
4.2	Preferred Fishway Design	4
4.3	Other Structural and Non-structural Alternatives	7
4.4	Alternative Comparison	7
5.0	Environmental Analysis	8
5.1	Wetlands	8
5.2	Fishery Resources	8
5.3	Wildlife Resources	9
5.4	Air and Water Quality	10
5.5	Threatened and Endangered Species	10
5.6	Socioeconomics	10
5.7	Historic and Cultural Resources	10
5.7.1	History of Fairmount Dam	10
5.7.2	Historic Fish Laws	11
5.7.3	Impacts on Historic and Cultural Resources	12
5.8	Environmental Justice	12
6.0	Relationship of Selected Plan to Environmental Statutes and Other Requirements	12
7.0	Coordination	13
8.0	References	13
9.0	Section 404(b)(1) Analysis	13
10.0	Clean Air Act Statement of Conformity	19
11.0	Correspondence and Public Comments	Appendix A

LIST OF FIGURES

Figure 1. Fairmount Dam Project Area.....	2
Figure 2. Fairmount Dam Fish Ladder Project Vicinity	3
Figure 3. Fairmount Dam Preferred Fishway Design.....	6

LIST OF TABLES

Table 1. Comparison of Alternatives for the Fairmount Fish Ladder Project	7
Table 2. Compliance with Appropriate Environmental Statutes	12

1.0 Project Location

The Schuylkill River is a tributary of the Delaware River located in Southeastern Pennsylvania and traverses through Philadelphia, Delaware, Montgomery, and Chester counties (Figure 1). The Schuylkill River is approximately 123 miles in length from its confluence with the Delaware River in Philadelphia to its headwaters in Pottsville. The Fairmount Dam Fish Ladder (Figure 2) is located in Philadelphia within the Fairmount Park property, Philadelphia County, Pennsylvania. Fairmount Dam is located 8.49 miles upstream from the Schuylkill's confluence with the Delaware River and is the uppermost reach of the Schuylkill that is influenced by tidal fluctuations. The Fairmount fish ladder is located on the west shore of the Fairmount Dam on the Schuylkill River across from the historic Waterworks and Philadelphia Museum of Art.

2.0 Study Authority

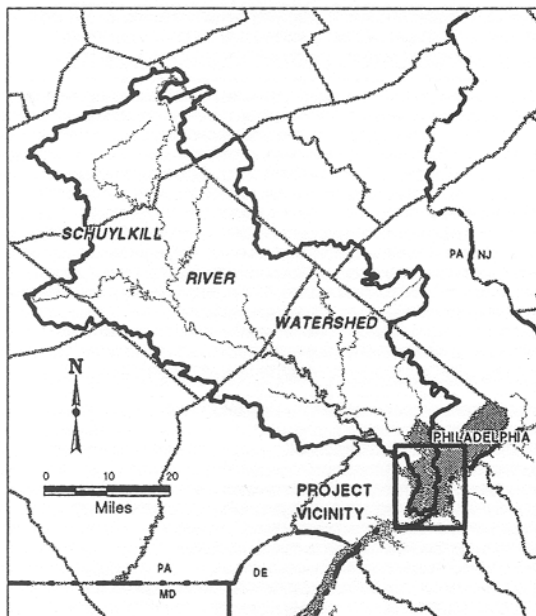
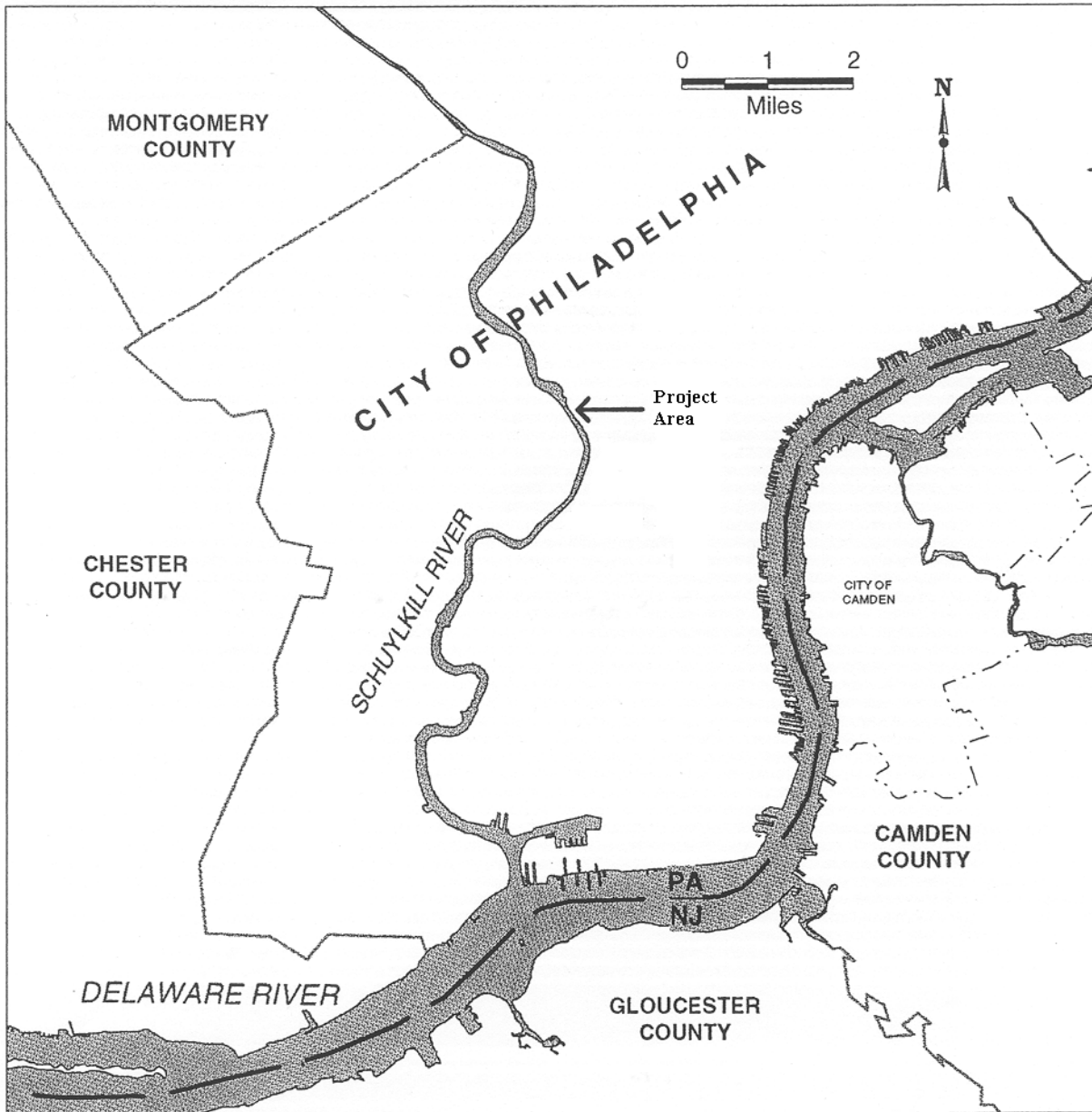
The U.S. Army Corps of Engineers' (Corps) authority for the Fairmount Dam Fish Ladder Project is Section 1135 of the Water Resources Development Act of 1986, as amended, which is used for improvements to the environment in the public interest. The purpose of the project under Section 1135 is to maximize spawning habitat available to migratory fish and reduce the impact of navigation channels on Schuylkill River fish populations.

3.0 Purpose and Need for Action

Many anadromous and catadromous fish spawning runs located throughout the Mid-Atlantic States have been lost through the construction of dams that are impassable to migratory fish. One such dam is the Fairmount Dam, which prevented passage of migratory species from 1818 until 1979. Starting in 1977 and continuing into 1978 a fish ladder was constructed on the western side of the Fairmount Dam. The Fairmount fish ladder was completed and operational in 1979.

Structural problems limit the ladder's efficiency at passing migratory fish. Improper design of the upstream exit of the ladder allows trash and debris to accumulate at such a rapid rate that, on average, cleaning the debris screen is necessary every other day during spring migrations. The upstream gate, used in shutting off water flow through the ladder, has been damaged rendering the gate inoperable without the use of specialized tools powered by portable generators.

The goal of the Fairmount Dam Fish Ladder Project is to significantly increase the ladder's efficiency through a redesigning and reconstruction of the structure to allow for passage of American shad, as well as other anadromous, catadromous and resident finfish species. This project is one of many fish passage projects that are to provide access to spawning and rearing habitat for migratory fish on the Schuylkill River. The Fairmount Dam fish ladder, as the most downstream passageway, is especially critical to the overall success of restoring fish passage on the Schuylkill River and its tributaries. All upstream work will be affected by the success or failure of the Fairmount Dam fish ladder at passing migratory species during spawning runs. The improvement to the ladder will be accomplished through renovations, the construction of additions to the existing ladder as well as modification of the design to allow American shad to proceed unimpeded through the ladder to the greatest extent possible so as to reach historic spawning and foraging areas upstream.



**FAIRMOUNT DAM
FIGURE 1
PROJECT AREA**

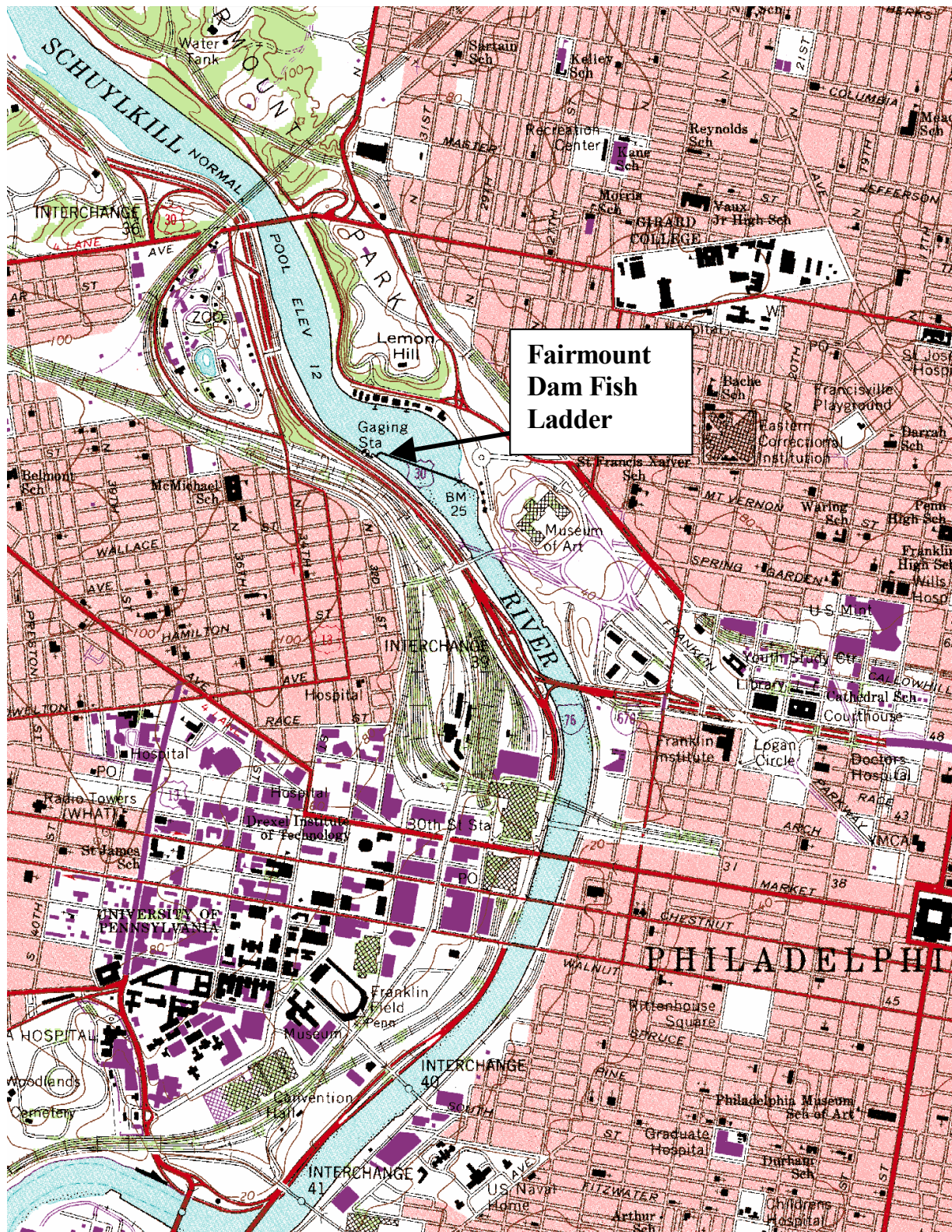


Figure 2. Fairmount Dam Fish Ladder Project Vicinity.

Great improvements in fishway technologies have been realized in the past 20 years since the Fairmount ladder was constructed. Based on estimates by the U.S. Fish and Wildlife Service, upon completion of the proposed improvements, the Fairmount Dam fish ladder is expected to pass 200,000 to 250,000 American shad (*Alosa sapidissima*) yearly. The Schuylkill, it has been estimated, has habitat to support 700,000 to 800,000 shad. The target species for this project is American shad however, other species such as blueback herring (*Alosa aestivalis*), striped bass (*Morone saxatilis*), and American eel (*Anguilla rostrata*) could also benefit from this project. Resident fish species will benefit from the enhanced potential to reach suitable spawning and nursery habitats, as well as from a larger forage base provided by juvenile anadromous species. Improving the efficiency of the Fairmount Dam fish ladder will provide access to approximately 12.2 miles of river to American shad as well as these other migratory fish species.

Multiple project designs for the ladder were evaluated in terms of ease of construction, dam safety, historical considerations, and fish passage success. Some secondary benefits that are expected as a result of this project are an increase in educational potential of this facility through increased public access and an increased public education focus. Through the above mentioned project goals, a more aesthetically pleasing area will also be created for both visitors to the ladder as well as general park users within the vicinity of the fish ladder. An increase in educational programs conducted by the Philadelphia Water Department (PWD) about the Schuylkill River, fisheries, and the fish ladder is expected after completion of this project. The PWD and other agencies and organizations have plans to further increase the educational potential through educational programs that they plan to conduct on site for school groups and members of the public. As part of the PWD educational programs, video of fish passing through the ladder from a real-time video camera at the ladder will be shown to the public. Video images will be sent directly to the Fairmount Park Interpretive Center that the PWD is involved with instituting at the Fairmount Water Works on the East Bank of the Schuylkill River. The benefits of this project are biological in terms of the increased aquatic habitat values, and societal in terms of the benefits to the region.

4.0 Alternatives

Due to the nature of this project, a limited number of alternatives are available to achieve the goals of fish passage and be sensitive to engineering, environmental, and historical criteria. The alternatives include no-action, reconstruction of the existing structure (preferred fishway design), replacement of the existing structure, and dam removal.

4.1 No-action

The no action alternative would leave the current fish ladder in its current degraded state and no increased fish access would be established. The migratory fish populations in the Schuylkill River would suffer setbacks. Over time, this lack of an efficient fish ladder at Fairmount Dam could stifle the growth of American shad and river herring populations in the Schuylkill River. In addition, recreational fishing opportunities and benefits to other wildlife would not be realized.

4.2 Preferred Fish Ladder Design (reconstruction of the existing structure).

There are other various ways to reconstruct the existing fish ladder. Based on recommendations from Mr. Dick Quinn, Fish Ladder Design Expert for the U.S. Fish and Wildlife Service and other resource agencies (i.e., The Pennsylvania Fish and Boat Commission), our preferred design alternative is the most efficient at passing migratory fish, most cost effective, and least visually impacting choice to achieve the project goals. In addition, a physical hydraulic model of the Fairmount Fish Ladder has been constructed by Alden Research Laboratory and will be used to develop the best fish ladder design

possible for the project. The proposed improvements to the Fairmount Dam fish ladder include (see Figure 3, conceptual design drawings):

- increasing attraction flow from the present ~ 20 cubic feet per second (cfs) to ~ 100 cfs, through piping additional water to the entrance of the ladder by repairing the non functional additional flow pump on site;
- replacing the old additional flow pump's butterfly valve and it's 24 inch pipe with a new butterfly valve and 30 inch pipe to transport water downstream to the fish ladder entrance (this will allow for optimal attraction flow at the fish ladder entrance);
- increasing the width of slots between each cell from the present 12 inches to 18 inches in width to allow for optimal passage of shad;
- changing pool to pool (cell to cell) elevation drop from the present 12 inches down to 9 inches;
- reconstructing the exit channel to allow for a perpendicular to flow exit from the ladder; this reconstruction will alleviate one of the primary problems being experienced by the ladder, and that is accumulation of trash and debris at the upstream, exit of the ladder;
- installing a new gate at the exit of the ladder;
- replacing the current intake screen with one that has vertical bars at least 12 inches apart and has no horizontal bars - which the current one does;
- installing articulated weir gates to control water surface elevation in the entrance channel;
- installing an approximately 5 ft non-overflow section on the crest of the dam adjacent to the fish ladder to prevent water from the spillway from competing with water from the fish ladder entrance;
- reconstructing the entrance to the ladder;
- replacing the damaged viewing window screening found inside the last cell of the ladder;
- rewiring the viewing window room to restore electric power;
- installation of a real-time camera to allow viewing of fish passing through the ladder to individuals in the interpretive center across the river from the ladder as well as via the internet;
- installing wrought iron fencing for site security;
- installing grating over cells of the ladder; and constructing restorative landscaping at the site.

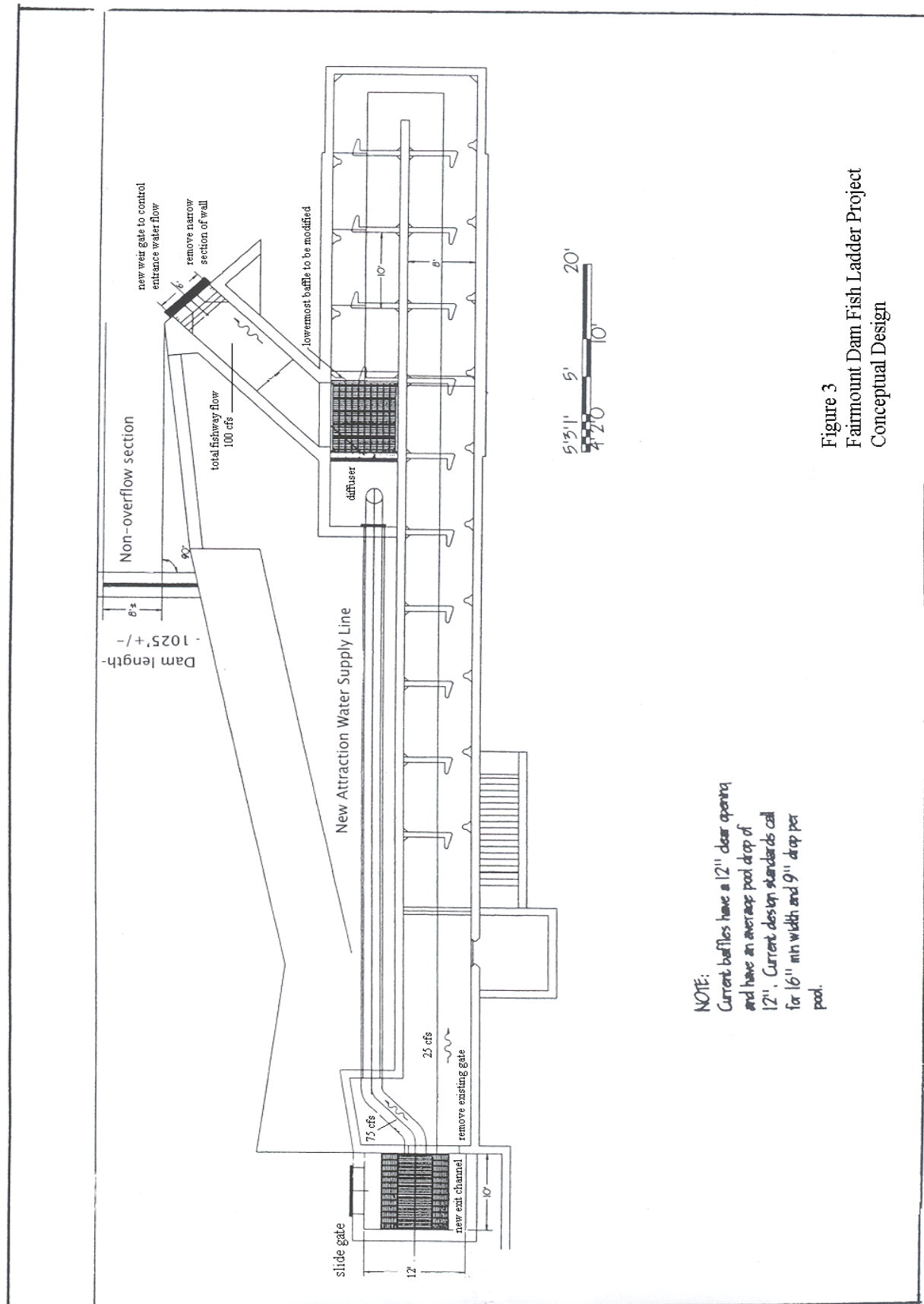


Figure 3. Fairmount Dam Preferred Fish Ladder Design.

4.3 Other Structural and Non-structural Alternatives

Several other alternatives were considered, but discounted due to engineering, maintenance, cost, or historical resources constraints. These alternatives included dam removal and an alternative fish ladder design.

- Dam removal would involve elimination of the existing dam originally built almost 200 years ago. This alternative would permit unimpeded access of American shad and river herring up the Schuylkill River. However, this option would remove an historic structure on the National Register and substantially alter the historic character of the Fairmount Water Works. Fairmount Dam is an integral part of the Philadelphia's historical and cultural community; and it is likely that there would be considerable public opposition to this option. In addition, the cost to remove the dam is estimated to be very high (see Section 4.4). Hence, dam removal was not considered a feasible alternative.
- Replacement of the existing structure with a new fish ladder. This alternative would be much more costly than our preferred plan because the existing structure would have to be demolished, debris removed, and a completely new fish ladder built in the same location. This alternative would potentially have additional historic (visual impacts) and environmental (disposal of debris, a longer duration of in-water work, etc.) issues associated with it. In addition, the cost estimate for this alternative is extremely high (see Section 4.4).

4.4 Alternative Comparison

TABLE 1. COMPARISON OF ALTERNATIVES FOR THE FAIRMOUNT FISH LADDER PROJECT.

Alternative	Potential Issues / Support	Cost	Benefits	Conclusion
No Action	Does not solve the problem.	\$0	None	Not recommended.
Reconstruction of Existing Structure	- Historic / environmental issues are resolved. - Supported by resource agencies.	\$1.2 million (estimate)	- Improved efficiency of fish ladder at passing migratory fish - Increased fishery populations in the Schuylkill River	Recommended.
Replacement of Existing Structure	- Historic / potential visual impacts of the new structure on the surrounding community. - Disposal of concrete debris.	\$2.5 million (estimate)	- Improved efficiency of fish ladder at passing migratory fish - Increased fishery populations in the Schuylkill River	Not recommended.

Dam Removal	- National Landmark - Sponsor does not want removed.	\$3.0 million (estimate)	- Increased fishery populations in the Schuylkill River.	Not recommended.
-------------	---	--------------------------	--	------------------

Our preferred design alternative (reconstructing the existing fish ladder) is the most efficient at passing migratory fish, most cost effective, least impacting on environmental and cultural resources, and supported by federal and state resource agencies.

5.0 Environmental Analysis

The Fairmount Dam Fish Ladder Project is a component of a larger Schuylkill River watershed fish passage plan attempting to restore fish passage from the confluence with the Delaware River to Kernsville Dam in Berne, Pennsylvania (a distance of approximately 100 miles). The Pennsylvania Department of Environmental Protection, in cooperation with the Pennsylvania Fish and Boat Commission, is currently pursuing other fish passage projects on the remaining impediments located along the Schuylkill River. Improving fish passage at the Fairmount fish ladder will benefit the entire freshwater ecology and economy of the Schuylkill River watershed. Resident fish species will benefit from the enhanced potential to reach suitable spawning and nursery habitat, and from a larger forage base provided by juvenile anadromous species.

5.1 Wetlands

There are no wetlands in the project area. The project site is an existing fish ladder structure located on the Schuylkill River in an urban area of Philadelphia, Pennsylvania.

5.2 Fishery Resources

By 1976, the Pennsylvania Fish and Boat Commission (PFBC) had completed a 4-½ year study of the feasibility of restoring American shad to the Schuylkill River. PFBC documented fish species below Fairmount Dam using gill nets and electrofishing. From 1974 to 1976, the presence of adult American shad was documented below Fairmount Dam on 18 of the 26 days sampled (69% of the time) for a total of 47 American shad. Most of the shad collected or observed were in close proximity to the base of the dam. Ichthyological Associates observed 150 American shad on May 19, 1975. A total of 45 species of fish were recorded below Fairmount Dam and many of these fish could be expected to travel above the dam if adequate fish passage was available. Based on the feasibility study and the documentation of American shad and river herring below Fairmount Dam, the plans for a fish passage facility began.

The Fairmount Fishway opened on April 2, 1979 and observations at the viewing window were recorded by PFBC from 1979 to 1984. During that period, a total of 30,904 fish representing 33 species were observed ascending the fishway. More importantly, 552 river herring, 50 American shad, and 2 striped bass were observed ascending the fishway. Despite the low number of striped bass observed in the fishway, a striped bass fishery developed at the base of Flatrock Dam by 1984, suggesting that substantial numbers of striped bass actually utilized the fishway. During this period, PFBC electrofishing operations consistently showed the presence of American shad, alewives, blueback herring, and white perch immediately downstream of Fairmount Dam. There seemed to be many more fish observed or collected below the dam than fish observed ascending the fishway.

In 2000, Philadelphia Water Department (PWD) conducted maintenance activities at the Fairmount Fishway that included collection and identification of fish. Collections made on May 26 and July 28 produced a total of 127 fish in the fish passage facility. Notably, three striped bass, one alewife and one

white perch were recorded. The following year, PWD conducted three clean-ups at Fairmount Fishway and recorded 109 fish. Striped bass and white perch, which are migratory species, were collected in the fishway in 2001.

During 2002, PWD performed an electrofishing survey of the Schuylkill River from Flatrock Dam downstream to the confluence with the Delaware River to relate the utilization of the fishway by migratory fish species with their presence in the river. A total of 4,028 fish representing 37 species were collected or observed during the electrofishing surveys completed on April 23, April 30, May 7, May 29, May 30, June 3, June 4, June 12, June 20, September 13, September 18, September 23, September 24, and September 25. The count included 67 American shad, 140 river herring (alewife and blueback herring are collectively known as river herring), 184 striped bass and 137 white perch. American shad, river herring, striped bass and white perch were present on all electrofishing dates prior to June.

River herring were abundant in April and May, and white perch and striped bass were abundant in May and June. The most significant discovery was one American shad and one river herring near the base of Flatrock Dam. According to PFBC, this is the first documented adult American shad above Fairmount Dam since it was built. The abundance of white perch collected and observed spawning near Flatrock Dam suggests they are utilizing the Fairmount Dam fish ladder.

In 2002, PWD conducted maintenance activities at the Fairmount Dam fish ladder that included collection and identification of fish. Collections made on March 3, April 20, May 18 and July 24 produced a total of 629 fish in the fish passage facility. Notably, one adult American shad, two alewives, one blueback herring, five striped bass, and 28 white perch were recorded.

Consultation with the National Marine Fisheries Service concluded no essential fish habitat under the Magnuson-Stevens Fishery Conservation and Management Act in the project area (see Appendix A). In addition, a restriction on construction of the project will be followed from April 1 to June 30th to prevent impacts to migratory fish during the spawning season.

5.3 Wildlife Resources

Due to the extensive development in the Schuylkill River watershed, there are limited wildlife resources in the project vicinity. In addition, the absence of a well-defined riparian buffer at the project location further limits wildlife populations in the project area.

Some examples of indigenous waterfowl which may frequent the project area include: Canada goose (*Branta canadensis*) and mallard (*Anas platyrhynchos*). Other bird species likely to inhabit the area include: kingfisher (*Megaceryle alcyon*), red-winged blackbird (*Agelaius phoeniceus*), American crow (*Corvus brachyrhynchos*), robin (*Turdus migratorius*), northern cardinal (*Richmondia cardinalis*), blue jay (*Cyanocitta cristata*), catbird (*Dumetella carolinensis*), and various species of sparrows. Additional bird species observed along the Schuylkill River include: great blue heron (*Ardea herodias*) and double-crested cormorant (*Phalacrocorax auritus*).

Although reptiles and amphibians were not actually surveyed within the project area, the following species are typically found inhabiting riverine zones: snapping turtle (*Chelydra serpentina*), water snake (*Natrix sipedon*), and American bullfrog (*Rana catesbeiana*). The eastern newt (*Notophthalmus viridescens*) and American toad (*Bufo americanus*) are additional representative species likely to reside in this area.

Mammals which are indicative of riparian zones and may occur in and around the Schuylkill River project area are: muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), opossum (*Didelphis*

virginiana), woodchuck (*Marmota monax*), chipmunk (*Tamias striata*), gray squirrel (*Scirus carolinensis*), eastern cottontail (*Sylvilagus floridanus*), and little brown bat (*Myotis lucifugus*).

5.4 Air and Water Quality

The air quality within the project area would be reflective of an urban area. Philadelphia County is designated as a nonattainment area for Ozone as of May 2002 (Environmental Protection Agency, Web Site 2003, www.epa.gov). Construction of the proposed fishway would cause temporary reduction of local ambient air quality due to fugitive dust and emissions generated by construction equipment. These temporary reductions in air quality would not have a significant impact on the air quality of the surrounding area.

Implementation of this project is not expected to alter water quality. All necessary soil erosion and sediment controls will be used during construction of the fishway to minimize project impacts to the Schuylkill River. In addition, the contractor will be required to complete a plan that describes measures to prevent hazardous construction materials (e.g., oils) from entering the river and possibly traveling downstream. Furthermore, all construction debris will be disposed of in an appropriate manner. The proposed project will not have any long-term adverse impacts on water quality in the Schuylkill River.

5.5 Threatened and Endangered Species

According to the U.S. Fish and Wildlife Service, Pennsylvania Field Office, the proposed project will have no effect on federally listed species (see Project Correspondence - Appendix A). In addition, the National Marine Fisheries Service has reviewed the project (see Project Correspondence - Appendix A) and concluded that there are no endangered or threatened species under their jurisdiction in the project area. However, they did request a seasonal restriction on in-water work between April 1 – June 30th and September 30 – November 30th.

5.6 Socioeconomics

The Fairmount Dam and associated Water Works are a historical and tourist destination visited by many visitors annually. Also, since the location of the fish ladder is close to the Philadelphia Art Museum, the opportunity exists for considerable environmental educations and public use of the project site. Fairmount Dam and Water Works are listed on the National Register of Historic Places.

The proposed project has received strong support from a variety of organizations including the Pennsylvania Fish and Boat Commission, Philadelphia Water Department, and Friends of the Fairmount Fish Ladder.

5.7 Historic and Cultural Resources

The Corps has consulted with the Pennsylvania State Historic Preservation Office (PASHPO) and other interested parties in order to identify, evaluate, and assess project impacts on historic properties pursuant to the cultural resources responsibilities under the National Historic Preservation Act of 1966 (NHPA), as amended, and its implementing regulations, 36 CFR 800. Section 106 of the NHPA, as amended, requires the Corps to consider the effect of its undertakings on cultural and historic resources (including prehistoric and historic sites, buildings, districts, or objects) which are listed or eligible for listing on the National Register of Historic Places.

5.7.1 History of Fairmount Dam

The following information was obtained from the WHYY-TV website (<http://www.whyy.org/tv12/secrets/water.html>).

The earliest Water Works building was constructed in 1812 to feed the water needs of a growing Philadelphia. Built in the years that preceded the industrial revolution, it was seen as an engineering marvel, drawing visitors from all parts of the world. The earliest building housed two steam engines, which pumped water up to reservoirs on the "Fair Mount" behind it. The location was chosen because it was the highest point in the area, hence the name Fair Mount, and would provide a good launch-point for the gravity-fed water systems that the city depended on in those days. The Philadelphia Museum of Art now sits on Fair Mount where the Water Works reservoirs lived for more than a century.

The dam, which is actually a spillway since it allows water to flow over it, was constructed to direct water around the back of the pump house and through the building, turning giant water wheels and driving the pumps. Previously, the pumps were steam driven, requiring enormous, expensive loads of fuel, and creating a dangerous environment for those who worked in the immediate area. The conversion to waterpower was a lucrative move for the city.

The reservoir had a capacity of 3 million gallons. The first steam driven pumps could fill the reservoir in one day. Each of the original steam engines consumed more than 3,000 cords of wood per year in order to pump 2 million gallons of water in a 24 hour period. Because of the enormous expense of operating the steam engines, the city was forced to search for a cheaper means of pumping the water to the reservoir. Water power proved much less costly, and on October 24, 1822, the steam engines were shut down forever. They were sold for scrap a few years later. In order to generate sufficient water flow through the mill house, the Schuylkill River had to be dammed. Cribs were built from hickory logs, floated to the appropriate spot in the river, and filled with stone until they sank. The cribs were then fastened to each other and to the bottom of the river. The dam was created at an angle to allow ice to break up in the winter.

After the last crib was sunk, the upstream water deepened and began spilling over the structure on July 23, 1821. The steam pumps would work for another year while the rest of the water powered system was constructed. A canal and lock system was constructed on the west shore so river traffic would not be hampered by the dam.

The following information was provided by Samantha Corrato, Philadelphia Water Department Archives in an email dated November 15, 2002: In 1819, the City of Philadelphia purchased water power rights from the Schuylkill Navigation Company and the dam was completed in 1822. It was originally built as a straight-drop, cribbed dam, which was constructed with wooden crates that were filled with rocks to slow water. The dam served the double purpose of forming a pool for slack navigation in conjunction with river locks, as well as providing water for the city. The dam was slightly modified in 1822 and in February of 1904 it was badly damaged by flooding and melting ice, creating the need for major repairs. In 1926, the crib dam was stabilized by the addition of a concrete mound dam built on the downriver side, which is the waterfall-like structure we see still being used today.

During the 1990's the Philadelphia Water Department completed a project, which raised the dam along the lower fish pier area. As part of that project, all the historic drawings on the dam were gathered (Grusheski, personal communication, 2002).

5.7.2 Historic Fish Laws

In 1623 the first fishery law in the Colonies (known as the Plymouth Colony Fish Law) was passed for the protection of alewives (Belding 1921). Between 1682 and 1727 a series of laws were enacted for the construction and maintenance of fish passage facilities, and for the prevention of all obstructions to the

passage of fish in rivers, except mill dams. In 1741, an act was passed that stated a sufficient fish passageway be made through or around each dam from the first day of April to the last day of May annually. The owners of the dams were required to give a sufficient water flow for the young to pass down and that the cost of installing fishways in dams erected before 1709 be borne by the towns and the future maintenance by the owner of the dam. In 1745, however, mill owners through political pressure secured a provision eliminating fishways if the fish did not pass upstream in adequate numbers to be of greater benefit than the loss due to the diminished water power. In addition, no dam owner had to keep open any passageway if there were no longer runs of alewives, shad, or salmon (Belding 1921).

5.7.3 Impacts on Historic and Cultural Resources

The project site borders of the historic Fairmount Dam and associated Fairmount Water Works, which are listed on the State and National Registers of Historic Places and is considered a National Landmark. The PASHPO has reviewed the conceptual design for the project under Section 106 of the NHPA and in a letter dated December 31, 2002, have concluded that the project will have no adverse effect upon cultural resources in the area, specifically the Fairmount Park Historic District. The final project design, to the extent possible, will incorporate provisions to blend the new components of the Fairmount Fish Ladder in with the existing architecture of the Fairmount Park Historic District.

5.8 Environmental Justice

All of the alternatives, including the selected plan, identified in this study are expected to comply with Executive Order 12989-Environmental Justice in Minority Populations and Low-Income Populations, dated February 11, 1994. The selected plan is not located in close proximity to a minority or low-income community, and no impacts are expected to occur to any minority or low-income communities in the area.

6.0 Relationship of Selected Plan to Environmental Requirements, Protection Statutes, and Other Requirements

In accordance with Section 401 of the Clean Water Act, a water quality certification will be obtained from Pennsylvania Department of Environmental Protection (PADEP) prior to construction of the project. Based on the information gathered during the preparation of the Environmental Assessment, and the application of appropriate measures to minimize project impacts, it was determined in accordance with Section 307(C) of the Coastal Zone Management Act of 1972 that the plan complies with and can be conducted in a manner that is consistent with the approved Coastal Zone Management Program of Pennsylvania. Discussions with staff from the Pennsylvania Coastal Zone Management Program have determined that the project will be consistent with the State Coastal Zone Plan upon issuance of the State water quality certificate. In addition, no cumulative impacts are anticipated to the environment as a result of this project.

TABLE 2. COMPLIANCE WITH APPROPRIATE ENVIRONMENTAL QUALITY PROTECTION STATUTES AND OTHER ENVIRONMENTAL REVIEW REQUIREMENTS.

STATUTE	COMPLIANCE STATUS
Clean Water Act	Full
Coastal Zone Management Act	Full
Endangered Species Act	Full
Fish and Wildlife Coordination Act	Full

STATUTE	COMPLIANCE STATUS
National Historic Preservation Act	Full
National Environmental Policy Act	Partial*
Clean Air Act	Full

NOTE:

Full Compliance: Having met all requirements of the statute, E.O., or other environmental requirements for the current stage of planning.

Partial Compliance: Some requirements of the statute, E.O., or other policy and related regulations remain to be met.

*All applicable laws and regulations will be fully complied with upon completion of the environmental review, obtaining State water quality certification, coastal zone consistency determination, and concurrence with our determination on cultural resources.

Noncompliance: None of the requirements of the statute, E.O., or other policy and related regulations remain to be met.

7.0 Coordination

During preparation of the Draft Environmental Assessment, several agencies were contacted and provided information. This draft Environmental Assessment is being circulated to various state and federal agencies for comments. Coordination, discussions, and project site visits have been conducted with the U.S. Fish and Wildlife Service, Pennsylvania Fish and Boat Commission, Philadelphia Water Department, Friends of the Fairmount Fish Ladder, as well as other agencies and individuals with interests in the project. See Appendix B for more detailed information on the coordination for this project.

8.0 References

Belding, D. L. 1921. A report upon the alewife fisheries of Massachusetts. Department of Conservation, Division of Fisheries and Game. Boston, Massachusetts.

Environmental Protection Agency. 2003. AirData: Nonattainment Areas Map. Web Site: www.epa.gov.

Philadelphia Water Department. 2002. Personal communication with Samantha Corrato, Archives Section, via an email dated November 15, 2002.

Philadelphia Water Department. 2002. Personal communication with Ed Grusheski via an email dated November 6, 2002.

WHYY-TV. Secrets beneath the streets. Web Site: <http://www.whyy.org/tv12/secrets/water.html>

9.0 Section 404(b)(1) Analysis

A review of the impacts associated with discharges to waters of the United States for the Fairmount Dam Fish Ladder Project, Philadelphia County, Pennsylvania is required by Section 404(b)(1) of the Clean Water Act, as amended (Public Law 92-500).

I. Project Description

- A. Location. The project area is located on the Schuylkill River, Philadelphia, PA (Figure 1).
- B. General Description. The Schuylkill River is a tributary of the Delaware River located in

Southeastern Pennsylvania and traversing through Philadelphia, Delaware, Montgomery, and Chester counties (Figure 1). The Schuylkill River is approximately 123 miles in length from its confluence with the Delaware River in Philadelphia to its headwaters in Pottsville. The Fairmount Dam fish ladder (Figure 2) is located within the Philadelphia City limits within the Fairmount Park property, Philadelphia County, Pennsylvania. Fairmount Dam is located 8.49 miles upstream from the Schuylkill's confluence with the Delaware River and is the uppermost reach of the Schuylkill that is influenced by tidal fluctuations.

C. Purpose. The goal of the Fairmount Dam Fish Ladder Project is to increase the ladder's efficiency through redesigning and reconstructing the structure to allow for passage of American shad, as well as other anadromous, catadromous and resident finfish species. This project is one of many fish passage projects that are to provide access to spawning and rearing habitat for migratory fish on the Schuylkill River. The Fairmount Dam fish ladder, as the most downstream passageway, is especially critical to the overall success of restoring fish passage on the Schuylkill River and its tributaries.

D. General Description of Dredged or Fill Material.

1. General Characteristics of Material: concrete
2. Quantity of Discharge (estimated): 1200 cu. ft
3. Source of Material: local contractor

E. Description of Discharge Site.

Location: The location of the discharge site will be the furthest upstream area of the existing fish ladder.

2. Size (acres):
Cofferdammed area: approximately 45 x 65 feet.
3. Type of Site: silt/clay/gravel river bottom
4. Type of Habitat: riverine
5. Timing and Duration of Discharge: 8 weeks working in the stream

F. Description of Discharge Method. Pouring of a new concrete pool structure for the fish ladder.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations.

1. Substrate Elevation and Slope: 6.0 NAVD 88 / flat river bottom
2. Sediment Type: silt/clay/gravel
3. Fill Material Movement:
Not significant.

4. Physical Effects on Benthos:
Temporary, during cofferdam installation and project construction of the new pool.
5. Actions taken to Minimize Impacts:
Installation of cofferdams to minimize sediment movement downstream of the dam. All in-stream work will be completed as quickly as possible to minimize impacts.

B. Water Circulation, Fluctuation and Salinity Determinations.

1. Water:
 - a. Salinity - No effect.
 - b. Water Chemistry – No significant effect.
 - c. Clarity - Short-term increase in suspended particles.
 - d. Color - Short-term increase in suspended particles.
 - e. Odor – No effect.
 - f. Taste - No effect.
 - g. Dissolved Gas Levels – No effect.
 - h. Nutrients – Short-term increase in nutrients available in the water column.
 - I. Eutrophication - No effect.
 - j. Temperature- No effect.
2. Current Patterns and Circulation:
 - a. Current Patterns and Flow – Temporary, minor effect on flow and patterns when the cofferdams are installed. Stream should recover quickly after cofferdams are removed.
 - b. Velocity - Temporary, minor effect on flow and patterns when the cofferdams are installed. Stream should recover quickly after cofferdams are removed.
 - c. Stratification - No effect.
3. Normal Water Level Fluctuations – Temporary, minor effect on flow and patterns when the cofferdams are installed. Stream should recover quickly after cofferdams are removed.
4. Salinity Gradients - No significant effect.

5. Actions That Will Be Taken To Minimize Impacts: Cofferdams will be used for the minimum time necessary for the placement of a new concrete pool for the fish ladder.

C. Suspended Particulate/Turbidity Determinations.

1. Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Fill Site: Minor effect. There is the potential for an increase in suspended particles/turbidity levels due to the installation of a cofferdam. Cofferdams will be used to limit sediment movement downstream of the project area.
2. Effects on Chemical and Physical Properties of the Water Column:
 - a. Light Penetration: Minor effect.
 - b. Dissolved Oxygen: Minor effect.
 - c. Toxic Metals and Organics: No effect.
 - d. Pathogens: No effect.
 - e. Aesthetics: Minor adverse and temporary effects limited to the construction period.
 - f. Temperature: No effect.
3. Effects on Biota:
 - a. Primary Production, Photosynthesis: Minor, short-term effects related to increases in turbidity during cofferdam activity. Minor loss of habitat due to the placement of a new pool for the fish ladder.
 - b. Suspension/Filter Feeders: Minor, short-term effects related to increases in turbidity during cofferdam activity. Minor loss of habitat due to the placement of a new pool for the fish ladder.
 - c. Sight feeders: No effect.
4. Actions Taken to Minimize Impacts: Cofferdams will be used to limit sediment movement and turbidity in the Schuylkill River during construction. In addition a time of year restriction (4/1 – 6/30) on construction will prevent impacts on fish during their spawning season.

D. Contaminant Determinations.

N/A

E. Aquatic Ecosystem and Organism Determinations.

1. Effects on Plankton: No effect.
2. Effects on Benthos: Major effect on benthos in cofferdammed section. Effect will be

temporary, approximately 8 weeks.

3. Effects on Nekton: No effect
4. Effects on Aquatic Food Web: Temporary, minor effect.
5. Effects on Special Aquatic Sites:
 - (a) Sanctuaries and Refuges: None.
 - (b) Wetlands: None.
 - (c) Tidal flats: None.
 - (d) Vegetated Shallows: None.
6. Threatened and Endangered Species: No effect.
7. Other Wildlife: Temporary, minor effect.
8. Actions to Minimize Impacts: All effort will be made to relocate biota and other fauna from the cofferdammed area (dry area) to appropriate habitat near the project site. In addition a time of year restriction (4/1 – 6/30) on construction will prevent impacts on fish during their spawning season.

F. Proposed Disposal Site Determinations.

1. Mixing Zone Determinations: N/A
 - a. Depth of water:
 - b. Current velocity:
 - c. Degree of turbulence:
 - d. Stratification:
 - e. Discharge vessel speed and direction:
 - f. Rate of discharge:
 - g. Dredged material characteristics:
2. Determination of Compliance with Applicable Water Quality Standards:
A section 401 Water Quality Certificate will be attained from the Pennsylvania Department of Environmental Protection prior to construction.
3. Potential Effects on Human Use Characteristics:
 - a. Municipal and Private Water Supply: No effect.
 - b. Recreational and Commercial Fisheries: Temporary, minor effect during construction.
 - c. Water Related Recreation: Temporary, minor effect.
 - d. Aesthetics: Temporary, minor effect.
 - e. Parks, National and Historical Monuments, National Seashore, Wilderness

Areas, Research Sites, and Similar Preserves: Minor effect resulting from the attachment of a non-overflow section on the crest of the Fairmount Dam.

G. Determination of Cumulative Effects on the Aquatic Ecosystem.
No significant adverse effects are anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem.
No significant secondary effects are anticipated.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

- A. Adaptation of the Section 404(b)(1) Guidelines to this evaluation - No significant adaptation of the guidelines were made relative to this evaluation.
- B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem - The selected plan was determined from a detailed evaluation of alternatives to have the least amount of environmental impacts.
- C. Compliance With Applicable State Water Quality Standards - The selected plan is not expected to violate any applicable state water quality standards in Pennsylvania.
- D. Compliance With Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act - The proposed discharge is not anticipated to violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
- E. Compliance With Endangered Species Act of 1973 -The selected plan will comply with the Endangered Species Act of 1973. Informal Section 7 consultation has been successfully completed with the U.S. Fish and Wildlife Service for this the project.
- F. Compliance With Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972 - No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are located within the project area.
- G. Evaluation of Extent of Degradation of Waters of the United States - The proposed project will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, and recreational and commercial fishing, plankton, fish and shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and wildlife will not be adversely affected. Significant adverse impacts on aquatic ecosystem diversity, productivity and stability, and recreation, aesthetics and economic values will not occur as a result of the project.
- H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem - Appropriate steps (as described above) will be taken to minimize potential adverse impacts of discharging material in the aquatic ecosystem.

10.0 CLEAN AIR ACT STATEMENT OF CONFORMITY

CLEAN AIR ACT STATEMENT OF CONFORMITY FAIRMOUNT DAM FISH LADDER PROJECT PHILADELPHIA COUNTY, PENNSYLVANIA

I have determined that the selected plan conforms to the applicable State Implementation Plan (SIP). The Environmental Protection Agency had no adverse comments under their Clean Air Act authority. No comments from the air quality management district were received during coordination of the draft feasibility report and environmental assessment. The selected plan would comply with Section 176 (c)(1) of the Clean Air Act Amendments of 1990.

Date

Thomas C. Chapman, P.E.
Lieutenant Colonel, Corps of Engineers
District Engineer

Appendix A

Relevant Project Correspondence

Appendix B

Public and Agency Comments to the Draft Environmental Assessment and Corps Responses